WHAT IS CLAIMED IS:

1. An inspection apparatus using nuclear magnetic resonance comprising a controller controlling a pulse sequence applying a radiofrequency magnetic field and a magnetic field gradient to a living body placed in a static magnetic field to detect a nuclear magnetic resonance signal produced from said living body, wherein said controller performs (1) in the state that said living body stops exhalation or inspiration, control of a first pulse sequence detecting said nuclear magnetic resonance signal to acquire a reference projection of an imaging section as the reference of monitoring of respiratory motion of said living body; (2) in the state that said living body breathes, control of executing once said first pulse sequence detecting said nuclear magnetic resonance signal to acquire a projection of said imaging section used for said monitoring and in the state that said living body breathes, of repeating a second pulse sequence detecting said nuclear magnetic resonance signal to acquire an image of said imaging section at predetermined repetition time intervals; and (3) control of collecting said nuclear magnetic resonance signals used for image reconstruction of said imaging section in said second pulse sequence based on a similarity coefficient between said projection and said reference projection.

2. An inspection apparatus using nuclear

34

magnetic resonance comprising a controller controlling a pulse sequence applying a radiofrequency magnetic field and a magnetic field gradient to a living body placed in a static magnetic field to detect a nuclear

5   magnetic resonance signal produced from said living body, wherein said controller performs (1) in the state that said living body stops exhalation or inspiration, control of a first pulse sequence detecting said nuclear magnetic resonance signal to acquire a

10 reference projection of an imaging section as the reference of monitoring of respiratory motion of said living body; (2) in the state that said living body breathes, control of executing once said first pulse sequence detecting said nuclear magnetic resonance

15 signal to acquire a projection of said imaging section used for said monitoring and in the state that said living body breathes, of repeating a second pulse sequence detecting said nuclear magnetic resonance signal to acquire an image of said imaging section at

20 predetermined repetition time intervals; (3) control of collecting said nuclear magnetic resonance signals used for the image reconstruction of said imaging section in said second pulse sequence by monitoring respiratory motion of said living body based on a similarity

25 coefficient between said projection and said reference projection; and (4) control of repeating said (2) to said (3).

    3. An inspection apparatus using nuclear

35

magnetic resonance comprising a controller controlling

a pulse sequence applying a radiofrequency magnetic

field and a magnetic field gradient to a living body

placed in a static magnetic field to detect a nuclear

5   magnetic resonance signal produced from said living

body and an arithmetic processor using said detected

nuclear magnetic resonance signal to perform image

reconstruction of an imaging section, wherein said

controller performs (1) in the state that said living

10   body stops exhalation or inspiration, control of a

first pulse sequence detecting said nuclear magnetic

resonance signal; and (2) in the state that said living

body breathes, control of executing once said first

pulse sequence and in the state that said living body

15   breathes, of repeating a second pulse sequence

detecting said nuclear magnetic resonance signal at

predetermined repetition time intervals, said

arithmetic processor performs (a) arithmetic processing

of acquiring a reference projection of said imaging

20   section from said nuclear magnetic resonance signal

detected in said first pulse sequence of said (1); (b)

arithmetic processing of acquiring a projection of said

imaging section from said nuclear magnetic resonance

signal detected in said first pulse sequence of said

25   (2); and (c) arithmetic processing of determining a

similarity coefficient between said projection and said

reference projection, and said controller performs (3)

control of monitoring respiratory motion of said living

36

body based on said similarity coefficient to collect
said nuclear magnetic resonance signals used for said
image reconstruction in said second pulse sequence; and
(4) control of repeating said (2) to said (3).

5   4. The inspection apparatus using nuclear
magnetic resonance according to claim 3, wherein in
said (3), said controller monitors said motion based on
comparison of a value of said similarity coefficient
with a predetermined threshold value.

10   5. An inspection apparatus using nuclear
magnetic resonance comprising a controller controlling
a pulse sequence applying a radiofrequency magnetic
field and a magnetic field gradient to a living body
placed in a static magnetic field to detect a nuclear

15   magnetic resonance signal produced from said living
body and an arithmetic processor using said detected
nuclear magnetic resonance signal to perform image
reconstruction of an imaging section, wherein said
controller performs (1) in the state that said living

20   body stops exhalation or inspiration, control of a
first pulse sequence detecting said nuclear magnetic
resonance signal; (2) in the state that said living
body breathes, control of executing once said first
pulse sequence; (3) in the state that said living body

25   breathes, control of repeating a second pulse sequence
detecting said nuclear magnetic resonance signal at
predetermined repetition time intervals; and (4)
control of repeating said (2) to said (3), said

arithmetic processor performs (a) arithmetic processing
of acquiring a reference projection of said imaging
section from said nuclear magnetic resonance signal
detected in said first pulse sequence of said (1); (b)
arithmetic processing of acquiring a projection of said
imaging section from said nuclear magnetic resonance
signal detected in said first pulse sequence of said
(2); and (c) arithmetic processing of determining a
similarity coefficient between said projection and said
reference projection, and said controller performs (5)
control of collecting said nuclear magnetic resonance
signals used for said image reconstruction in said
second pulse sequence based on comparison of a value of
said similarity coefficient with a predetermined
threshold value.

6. An inspection apparatus using nuclear
magnetic resonance comprising a controller controlling
a pulse sequence applying a radiofrequency magnetic
field and a magnetic field gradient to a living body
placed in a static magnetic field to detect a nuclear
magnetic resonance signal produced from said living
body and an arithmetic processor using said detected
nuclear magnetic resonance signal to perform image
reconstruction of an imaging section, wherein said
controller performs (1) in the state that said living
body stops exhalation or inspiration, control of a
first pulse sequence detecting said nuclear magnetic
resonance signal; (2) in the state that said living

body breathes, control of executing once said first
pulse sequence; and (3) control of repeating a second
pulse sequence detecting said nuclear magnetic
resonance signal at predetermined repetition time
5   intervals, said arithmetic processor performs (a)
arithmetic processing of acquiring a reference
projection of said imaging section from said nuclear
magnetic resonance signal detected in said first pulse
sequence of said (1); (b) arithmetic processing of
10   acquiring a projection of said imaging section from
said nuclear magnetic resonance signal detected in said
first pulse sequence of said (2); and (c) arithmetic
processing of determining a similarity coefficient
between said projection and said reference projection,
15   and said controller performs (4) control of collecting
said nuclear magnetic resonance signals used for said
image reconstruction in said second pulse sequence
based on said similarity coefficient.

        7. An inspection apparatus using nuclear
20   magnetic resonance comprising a controller controlling
a pulse sequence applying a radiofrequency magnetic
field and a magnetic field gradient to a living body
placed in a static magnetic field to detect a nuclear
magnetic resonance signal produced from said living
25   body and an arithmetic processor using said detected
nuclear magnetic resonance signal to perform image
reconstruction of an imaging section, wherein said
controller performs (1a) in the state that said living

body stops exhalation, control of a first pulse
sequence detecting said nuclear magnetic resonance
signal; (2) in the state that said living body breathes,
control of executing once said first pulse sequence;
and (3) control of repeating a second pulse sequence
detecting said nuclear magnetic resonance signal at
predetermined repetition time intervals, said
arithmetic processor performs (a) arithmetic processing
of acquiring a reference projection of said imaging
section from said nuclear magnetic resonance signal
detected in said first pulse sequence of said (1a); (b)
arithmetic processing of acquiring a projection of said
imaging section from said nuclear magnetic resonance
signal detected in said first pulse sequence of said
(2); and (c) arithmetic processing of determining a
similarity coefficient between said projection and said
reference projection, and said controller performs (4)
control of collecting said nuclear magnetic resonance
signals used for said image reconstruction in said
second pulse sequence when a value of said similarity
coefficient is larger than a predetermined threshold
value.

8. The inspection apparatus using nuclear
magnetic resonance according to claim 7, wherein said
controller executes once said first pulse sequence of
said (1a).

9. The inspection apparatus using nuclear
magnetic resonance according to claim 7, wherein said

40

controller performs control of repeating said first pulse sequence of said (1a) at said predetermined repetition time intervals, and said arithmetic processor obtains an average of projections of said imaging section acquired from said nuclear magnetic resonance signals detected by repeating said first pulse sequence of said (1a) as said reference projection.

10. The inspection apparatus using nuclear magnetic resonance according to claim 7, wherein between control of said (1a) and control of said (2), said controller performs (1b) in the state that said living body breathes, control of repeating said first pulse sequence at said predetermined repetition time intervals, and said arithmetic processor performs arithmetic processing of determining frequency of appearance of said similarity coefficient between a projection of said imaging section acquired from said nuclear magnetic resonance signals detected by repeating said first pulse sequence of said (1b) and said reference projection and decides, as said predetermined threshold value, said similarity coefficient in which the sum of said frequency of appearance in a part in which said similarity frequency is close to 1 is 1/m of the sum of said frequency of appearance where m is a positive number of 3 or above.

11. An inspection apparatus using nuclear magnetic resonance comprising a controller controlling

41

a pulse sequence applying a radiofrequency magnetic

field and a magnetic field gradient to a living body

placed in a static magnetic field to detect a nuclear

magnetic resonance signal produced from said living

5 body and an arithmetic processor using said detected

nuclear magnetic resonance signal to perform image

reconstruction of an imaging section, wherein said

controller performs (1) in the state that said living

body stops exhalation, control of a first pulse

10 sequence detecting said nuclear magnetic resonance

signal; (2) in the state that said living body breathes,

control of repeating said first pulse sequence at

predetermined repetition time intervals; (3) in the

state that said living body breathes, control of

15 executing once said first pulse sequence; (4) control

of repeating a second pulse sequence detecting said

nuclear magnetic resonance signal at said predetermined

repetition time intervals; and (5) control of repeating

said (3) to said (4), said arithmetic processor

20 performs (a) arithmetic processing of acquiring a

reference projection of said imaging section from said

nuclear magnetic resonance signal detected in said

first pulse sequence of said (1); (b) arithmetic

processing of acquiring a projection of said imaging

25 section from said nuclear magnetic resonance signal

detected in said first pulse sequence of said (2); (c)

arithmetic processing of determining a similarity

coefficient between said projection and said reference

projection; and (d) arithmetic processing of determining a predetermined threshold value from frequency of appearance of said similarity coefficient, and said controller performs (6) control of collecting said nuclear magnetic resonance signals used for said image reconstruction in said second pulse sequence when a value of said similarity coefficient is larger than said predetermined threshold value.

12. The inspection apparatus using nuclear magnetic resonance according to claim 11, wherein said similarity coefficient in which the sum of said frequency of appearance in a part in which said similarity frequency is close to 1 is 1/m of the sum of said frequency of appearance where m is a positive number of 3 or above is decided as said predetermined threshold value.

13. An inspection apparatus using nuclear magnetic resonance comprising a controller controlling a pulse sequence applying a radiofrequency magnetic field and a magnetic field gradient to a living body placed in a static magnetic field to detect a nuclear magnetic resonance signal produced from said living body and an arithmetic processor using said detected nuclear magnetic resonance signal to perform image reconstruction of an imaging section, wherein said controller performs (1) in the state that said living body stops exhalation, control of executing a first pulse sequence having a first time section applying, to

said living body, a slice select magnetic field
gradient having a positive polarity and a
radiofrequency magnetic field, a second time section
applying, to said living body, a readout magnetic field
5   gradient having a negative polarity, a third time
section detecting said nuclear magnetic resonance
signal in the state of applying said readout magnetic
field gradient having a positive polarity, and a fourth
time section applying, to said living body, said
10   readout magnetic field gradient having a negative
polarity; (2) in the state that said living body
breathes, control of executing once said first pulse
sequence; (3) in the state that the living body
breathes, control of executing, after said first pulse
15   sequence of said (2), a second pulse sequence repeating,
at predetermined repetition time intervals, a pulse
sequence having a fifth time section applying, to said
living body, said slice select magnetic field gradient
having a positive polarity and said radiofrequency
20   magnetic field, a sixth time section applying, to said
living body, respective magnetic field gradients of a
phase-encoding magnetic field gradient and a readout
magnetic field gradient having a negative polarity, a
seventh time section detecting said nuclear magnetic
25   resonance signal in the state of applying said readout
magnetic field gradient having a positive polarity, and
an eighth time section applying, to said living body,
said phase-encoding magnetic field gradient having the

opposite polarity of the polarity of said phase-encoding magnetic field gradient applied in said second time section and said readout magnetic field gradient having a negative polarity, by changing the magnitude

5   of said phase-encoding magnetic field gradient; and (4) control of repeating said (2) to said (3), said arithmetic processor performs (a) arithmetic processing of one-dimensional inverse Fourier transforming said nuclear magnetic resonance signal detected in said

10   first pulse sequence of said (1) to acquire a reference projection of said imaging section in the direction applying said readout magnetic field gradient of said imaging section; (b) arithmetic processing of one-dimensional inverse Fourier transforming said nuclear

15   magnetic resonance signal detected in said first pulse sequence of said (2) to acquire a projection in the direction applying said readout magnetic field gradient of said imaging section; and (c) arithmetic processing of determining a similarity coefficient between said

20   projection and said reference projection, and said controller performs (5) control of collecting said nuclear magnetic resonance signals used for said image reconstruction in said second pulse sequence based on comparison of a value of said similarity coefficient

25   with a predetermined threshold value.

            14. The inspection apparatus using nuclear magnetic resonance according to claim 13, wherein said controller performs control of collecting said nuclear

magnetic resonance signals used for said image reconstruction in said second pulse sequence when a value of said similarity coefficient is larger than a predetermined threshold value.

5   15. The inspection apparatus using nuclear magnetic resonance according to claim 13, wherein said arithmetic processor performs arithmetic processing of determining frequency of appearance of said similarity coefficient and decides, as said predetermined

10   threshold value, said similarity coefficient in which the sum of said frequency of appearance in a part in which said similarity frequency is close to 1 is 1/m of the sum of said frequency of appearance where m is a positive number of 3 or above.

15   16. The inspection apparatus using nuclear magnetic resonance according to claim 13, wherein said controller executes once said first pulse sequence of said (1).

         17. The inspection apparatus using nuclear

20   magnetic resonance according to claim 13, wherein said controller performs control of repeating said first pulse sequence of said (1) at said predetermined repetition time intervals, and said arithmetic processor obtains an average of projections of said

25   imaging section acquired from said nuclear magnetic resonance signals detected by repeating said first pulse sequence of said (1), as said reference projection.

18. An inspection apparatus using nuclear
magnetic resonance comprising a controller controlling
a pulse sequence applying a radiofrequency magnetic
field and a magnetic field gradient to a living body
5   placed in a static magnetic field to detect a nuclear
magnetic resonance signal produced from said living
body and an arithmetic processor using said detected
nuclear magnetic resonance signal to perform image
reconstruction of an imaging section, wherein said
10   controller performs (1) in the state that said living
body stops exhalation, control of executing a first
pulse sequence having a first time section applying, to
said living body, a slice select magnetic field
gradient having a positive polarity and a
15   radiofrequency magnetic field, a second time section
applying, to said living body, a readout magnetic field
gradient having a negative polarity, a third time
section detecting said nuclear magnetic resonance
signal in the state of applying said readout magnetic
20   field gradient having a positive polarity, and a fourth
time section applying, to said living body, said
readout magnetic field gradient having a negative
polarity; (2) in the state that said living body
breathes, control of repeating said first pulse
25   sequence at predetermined repetition time intervals;
(3) in the state that said living body breathes,
control of executing once said first pulse sequence;
(4) in the state that said living body breathes,

control of executing, after said first pulse sequence

of said (3), a second pulse sequence repeating, at said

predetermined repetition time intervals, a pulse

sequence having a fifth time section applying, to said

5   living body, said slice select magnetic field gradient

having a positive polarity and said radiofrequency

magnetic field, a sixth time section applying, to said

living body, respective magnetic field gradients of a

phase-encoding magnetic field gradient and a readout

10   magnetic field gradient having a negative polarity, a

seventh time section detecting said nuclear magnetic

resonance signal in the state of applying said readout

magnetic field gradient having a positive polarity, and

an eighth time section applying, to said living body,

15   said phase-encoding magnetic field gradient having the

opposite polarity of the polarity of said phase-

encoding magnetic field gradient applied in said second

time section and said readout magnetic field gradient

having a negative polarity, by changing the magnitude

20   of said phase-encoding magnetic field gradient; and (5)

control of repeating said (3) to said (4), said

arithmetic processor performs (a) arithmetic processing

of one-dimensional inverse Fourier transforming said

nuclear magnetic resonance signal detected in said

25   first pulse sequence of said (1) to acquire a reference

projection of said imaging section in the direction

applying said readout magnetic field gradient of said

imaging section; (b) arithmetic processing of one-

dimensional inverse Fourier transforming said nuclear
magnetic resonance signal detected in said first pulse
sequence of said (2) to acquire a projection in the
direction applying said readout magnetic field gradient
5   of said imaging section; (c) arithmetic processing of
determining a similarity coefficient between said
projection acquired in said (b) and said reference
projection; (d) arithmetic processing of determining a
predetermined threshold value from frequency of
10   appearance of said similarity coefficient; (e)
arithmetic processing of one-dimensional inverse
Fourier transforming said nuclear magnetic resonance
signal detected in said first pulse sequence of said
(3) to acquire a projection in the direction applying
15   said readout magnetic field gradient of said imaging
section; and (f) arithmetic processing of determining a
similarity coefficient between said projection acquired
in said (e) and said reference projection, and said
controller performs (6) control of collecting said
20   nuclear magnetic resonance signals used for said image
reconstruction in said second pulse sequence based on
comparison of a value of said similarity coefficient
determined in said (f) with said predetermined
threshold value.

25   19. The inspection apparatus using nuclear
magnetic resonance according to claim 18, wherein said
controller performs control of collecting said nuclear
magnetic resonance signals used for said image

reconstruction in said second pulse sequence when a value of said similarity coefficient is larger than a predetermined threshold value.

20. An inspection apparatus using nuclear magnetic resonance comprising a controller controlling a pulse sequence applying a radiofrequency magnetic field and a magnetic field gradient to a living body placed in a static magnetic field to detect a nuclear magnetic resonance signal produced from said living body, wherein said controller performs (1) control of a first pulse sequence detecting said nuclear magnetic resonance signal to acquire a reference projection of an imaging section as the reference of monitoring of a heartbeat of said living body; (2) control of executing once said first pulse sequence detecting said nuclear magnetic resonance signal to acquire a projection of said imaging section used for said monitoring and of repeating a second pulse sequence detecting said nuclear magnetic resonance signal to acquire an image of said imaging section at predetermined repetition time intervals; and (3) control of collecting said nuclear magnetic resonance signals used for image reconstruction of said imaging section in said second pulse sequence based on a similarity coefficient between said projection and said reference projection.

21. An inspection apparatus using nuclear magnetic resonance comprising control means executing a pulse sequence applying a radiofrequency magnetic field

and a magnetic field gradient to a living body placed in a static magnetic field to detect a nuclear magnetic resonance signal produced from said living body; and means performing reconstruction of a projection using said detected nuclear magnetic resonance signal to monitor motion of said living body, wherein said control means executes said pulse sequence acquiring said projection and determines a similarity coefficient between said projection and a reference projection acquired in engagement with said pulse sequence to monitor motion of said living body.